

What Is a Quadratic Function?

Key Information

A quadratic function is a function that can be written in standard form: $y = ax^2 + bx + c$

where a , b , and c are constants and $a \neq 0$.

The highest exponent of the variable is 2, so a quadratic function has degree 2. Its graph is a curved shape called a parabola.

Identifying Quadratic Functions

For each function, write **Quadratic**, **Linear**, or **Other**.

1. $y = 3x^2 + 2x - 5$ _____

2. $y = 4x + 7$ _____

3. $y = x^3 - 2x$ _____

4. $y = -2x^2 + 8$ _____

5. $y = 3x + 1$ _____

6. $y = 5 - x^2$ _____

Standard Form

Rewrite each quadratic function in standard form, $y = ax^2 + bx + c$. Then identify a , b , and c .

7. $y = 4 + 3x^2 - 2x$ Standard form: _____

$a =$ _____

$b =$ _____

$c =$ _____

8. $y = 7x - x^2 + 1$ Standard form: _____

$a =$ _____

$b =$ _____

$c =$ _____

9. $y = 2x^2 - 6$ Standard form: _____

$a =$ _____

$b =$ _____

$c =$ _____

What Is a Quadratic Function?

Degree of a Polynomial

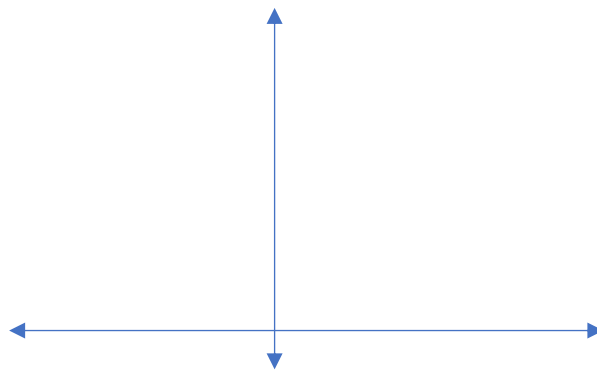
State the degree of each polynomial.

- | | |
|-----------------------|---------------|
| 10. $5x + 2$ | Degree: _____ |
| 11. $3x^2 - x + 8$ | Degree: _____ |
| 12. $7x^4 + 2x^2 - 1$ | Degree: _____ |
| 13. 99 | Degree: _____ |
| 14. $x^3 - 4x^2 + x$ | Degree: _____ |

Thinking About Parabolas

15. Complete the value table for $y = x^2$.

x	-3	-2	-1	0	1	2	3
$y = x^2$							



16. Plot the points from the table above and join them with a smooth curve.

17. What is the name of the curved graph formed by a quadratic function?

18. Describe one difference between the graph of a linear function and the graph of a quadratic function.

19. Why does $y = x^2$ not form a straight line?

20. A student says that $y = 6x + 2x^2 - 3$ is not quadratic because the x^2 term is not written first.

Is the student correct? Explain your answer and rewrite the function in standard form.

Standard form: _____

What Is a Quadratic Function?

Answer Key

Identifying Quadratic Functions

For each function, write **Quadratic**, **Linear**, or **Other**.

- | | |
|------------------------|---------------|
| 7. $y = 3x^2 + 2x - 5$ | Quadratic |
| 8. $y = 4x + 7$ | Linear |
| 9. $y = x^3 - 2x$ | Other (Cubic) |
| 10. $y = -2x^2 + 8$ | Quadratic |
| 11. $y = 3x + 1$ | Linear |
| 12. $y = 5 - x^2$ | Quadratic |

Standard Form

Rewrite each quadratic function in standard form, $y = ax^2 + bx + c$. Then identify a, b, and c.

- | | | |
|------------------------|----------------|---------------------|
| 8. $y = 4 + 3x^2 - 2x$ | Standard form: | $y = 3x^2 - 2x + 4$ |
| $a = 3$ | $b = -2$ | $c = 4$ |
| 9. $y = 7x - x^2 + 1$ | Standard form: | $y = -x^2 + 7x + 1$ |
| $a = -1$ | $b = 7$ | $c = 1$ |
| 10. $y = 2x^2 - 6$ | Standard form: | $y = 2x^2 - 6$ |
| $a = 2$ | $b = 0$ | $c = -6$ |

What Is a Quadratic Function?

Degree of a Polynomial

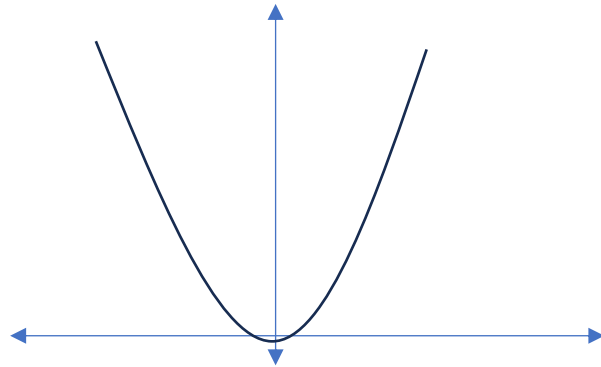
State the degree of each polynomial.

- | | |
|-----------------------|-----------|
| 15. $5x + 2$ | Degree: 1 |
| 16. $3x^2 - x + 8$ | Degree: 2 |
| 17. $7x^4 + 2x^2 - 1$ | Degree: 4 |
| 18. 99 | Degree: 0 |
| 19. $x^3 - 4x^2 + x$ | Degree: 3 |

Thinking About Parabolas

16. Complete the value table for $y = x^2$.

x	-3	-2	-1	0	1	2	3
$y = x^2$	9	4	1	0	1	4	9



18. Plot the points from the table above and join them with a smooth curve.

19. What is the name of the curved graph formed by a quadratic function?

Parabola

19. Describe one difference between the graph of a linear function and the graph of a quadratic function.

Quadratic is curved and symmetric

20. Why does $y = x^2$ not form a straight line?

The x-values are squared

21. A student says that $y = 6x + 2x^2 - 3$ is not quadratic because the x^2 term is not written first.

Is the student correct? Explain your answer and rewrite the function in standard form.

NO, it can be rearranged

Standard form: $y = 2x^2 + 6x - 3$